

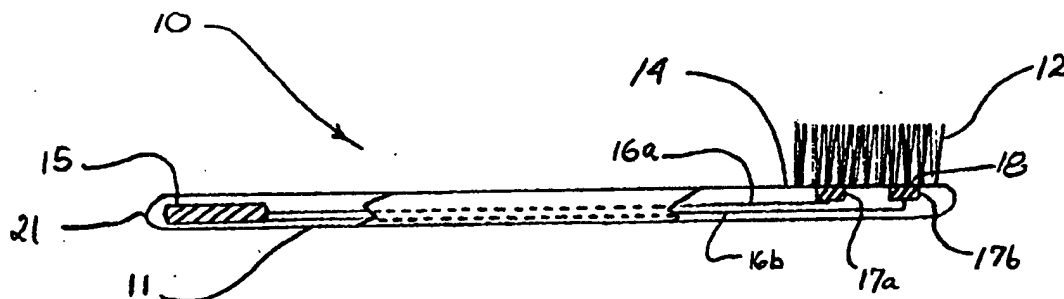
PCTWORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵ : A46B 15/00, G08B 3/00, A47G 19/22, 21/18, A63H 23/10, F41J 5/00		A2	(11) International Publication Number: WO 94/17691
			(43) International Publication Date: 18 August 1994 (18.08.94)
(21) International Application Number: PCT/US94/01297			(81) Designated States: AT, AU, BB, BG, BR, CA, CH, DE, DK, ES, FI, GB, HU, JP, KP, KR, LK, LU, MG, MN, MW, NL, NO, PL, RO, RU, SD, SE, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).
(22) International Filing Date: 4 February 1994 (04.02.94)			
(30) Priority Data: 08/013,940 4 February 1993 (04.02.93) US			
(71) Applicant (for all designated States except US): LITTLE ACORN VENTURES, INC. [US/US]; 509 Kerrwood Road, Pittsburgh, PA 15215 (US).			
(72) Inventors; and (75) Inventors/Applicants (for US only): KLINE, Michael, J. [US/US]; 509 Kerrwood Road, Pittsburgh, PA 15215 (US). POTTGEN, Paul, A. [US/US]; 4561 Dogwood Drive, Allison Park, PA 15101 (US). SZUMINSKY, Neil, J. [US/US]; 1427 Hillsdale Avenue, Pittsburgh, PA 15216 (US). MEAD, Marilyn, A. [US/US]; 406 Eastern Avenue, Pittsburgh, PA 15215 (US).			
(74) Agent: KLINE, Michael, J.; Thorp Reed & Armstrong, One Riverfront Center, Pittsburgh, PA 15222 (US).			

Published

Without international search report and to be republished upon receipt of that report.

(54) Title: SIGNAL GENERATING DEVICES**(57) Abstract**

The specification discloses a number of devices for sensing wetness and producing a signal in response thereto. A toothbrush (10) is disclosed in which the toothbrush (10) plays a song or initiates a series of phrases in response to being placed in the user's mouth or under running water. Another embodiment of the invention includes a straw (40) which signals fluid being drawn through the straw (40) and produces a sound in response thereto. The straw (40) may be integrally attached to a cup (30) for producing the signal. Also, a cup (30) is disclosed which has a signal generating device for responding to fluid being placed in, or emptied from, the cup (30). A floatable object (50), e.g. a toy, is also disclosed which produces a signal in response to being placed in the fluid in which it floats. Also disclosed is a garment (60) which produces a signal in response to a fluid impinging on the garment (60). Finally, a toilet (70) is disclosed for use with toilet (70) training, for example, which produces a signal in response to a user of the toilet (70) hitting a "target" (73) in the toilet (70).

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgyzstan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

SIGNAL GENERATING DEVICES

FIELD OF THE INVENTION

The present invention relates to devices that are capable of generating signals when placed under, in, or impinged upon by, an electrically conductive material, such as the mouth, or an aqueous solution.

BACKGROUND OF THE INVENTION

Every parent is familiar with the difficulty of encouraging children to brush their teeth. For most parents, the toothbrushing ritual includes a daily regimen of threats and compromises to encourage young children to brush their own teeth, or in the case of younger children, to encourage the child to allow the parent to have the honors.

The benefits of toothbrushing, particularly when a fluoride toothpaste is used, and particularly when a tartar control fluoride toothpaste is used, are well documented and need no further discussion here. Of course, these benefits are lost if a regular brushing habit is not followed.

There is on the market a fork and spoon set that talks to children, saying things such as "You're my special friend, I love you." These devices are sold as "Yummie Spoon and Fork" by the Right Start Catalog, 5334 Sterling Center Drive, West Lake Village, California 91361. These devices, however, require a button to be pushed to initiate the playing of the recorded message, and are in no way interactive with the user of the devices. A "melody toothbrush" is marketed by Even-Flo Products Company, 771 North Freedom Street, Ravenna, Ohio 44266. This toothbrush produces chimes when moved up and down. This toothbrush, however, does not provide a recorded message, and is not interactive with the user except in the limited context described.

Accordingly, a significant advance in the art could be realized if a toothbrush could be developed that would more strongly encourage children, and particularly young children, to want to brush their teeth or have their
5 teeth brushed on a regular basis.

Another common problem with respect to children is encouraging them to eat their food and/or drink liquids. Yet another common problem of parents is encouraging children to bathe themselves or even be given a bath. Yet
10 another problem associated with childraising is encouraging young children, especially boys, to properly use a training potty.

Accordingly, a significant advance in the art could be realized if devices could be developed that would
15 more strongly encourage children, and particularly young children, to become more independent and self-sufficient.

SUMMARY OF THE INVENTION

The aforescribed problem has been solved by virtue of the present invention. A toothbrush capable of
20 generating sound, such as music or phrases is provided. The toothbrush includes a handle with a brush attached thereto on one side thereof, and further includes a pair of spaced electrical contacts adapted to be electrically bridged by moisture, such as water or saliva.

25 The toothbrush further includes a signal generating device having a battery for power connected to the device. The sound generating device is connected by a pair of electrical leads to the spaced contacts.

In another embodiment of the invention, a cup is
30 provided having a signal generating device associated therewith, which generates a signal such as sound, when filled with a liquid that conducts electricity, such as water.

In still another embodiment of the invention, a straw is provided which produces a signal, such as a musical sound, when a liquid is drawn through the straw.

5 In still another embodiment of the invention, a floatable object, such as a rubber duck, boat, fish, whale, etc., is provided that produces a sound, such as a tune, when placed in contact with water, such as in the bathtub.

10 In still another embodiment of the invention, a toilet is provided with a signal generating device for producing a signal when a child urinates into the toilet and, more specifically, when a child urinates at a target within the toilet, which may comprise a urinal.

15 In still another embodiment of the invention, a garment capable of generating a signal is disclosed, the garment having a signal generating device associated therewith, and capable of generating a signal, such as a sound or flashing light, upon being struck with a spray of water, such as from a water pistol.

20 These and other advantages of the present invention will become more readily apparent as the following detailed description of the preferred embodiments proceeds.

25 **BRIEF DESCRIPTION OF THE DRAWINGS**

In the accompanying drawings, the preferred embodiments of the invention and preferred methods of practicing the invention are illustrated in which:

30 Fig. 1 is a side elevational, partial cross sectional view of a preferred toothbrush of the present invention.

Fig. 2 is a side elevational, partial cross sectional view of another preferred embodiment of a toothbrush of the present invention.

Fig. 3 is a bottom plan view of a preferred embodiment of the present invention.

Fig. 4 is a side elevational, partial cross-sectional view of another preferred embodiment of a toothbrush of the present invention.

Fig. 5 is a perspective view of a preferred embodiment of a toothbrush of the present invention.

Fig. 6 is an elevational view of a preferred embodiment of a cup of the present invention.

Fig. 7 is a top plan view of the cup of Fig. 6.

Fig. 8 is a bottom plan view of the cup of Fig. 6.

Fig. 9 is a schematic illustration of a preferred embodiment of a straw of the present invention.

Fig. 10 is a close-up, partial sectional view of a portion of the straw of Fig. 9.

Fig. 11 is a side elevational, partial cross-sectional view of a cup with a straw formed integrally therewith, according to another preferred embodiment of the invention.

Fig. 12 is a top elevational, cross-sectional view of the embodiment of Figure 11 taken along the lines A-A.

Fig. 13 is a schematic representation of a floatable object according to another preferred embodiment of the present invention.

Fig. 14 is a schematic representation of a garment according to yet another preferred embodiment of the present invention.

Fig. 15 is a schematic illustration of a urinal according to still another preferred embodiment of the present invention.

Figs. 16-18 are circuit diagrams of preferred signal generating devices for use in preferred embodiments of the present invention.

Fig. 19 is a cross-sectional view of a portion of the urinal illustrated in Figure 15 taken along lines A-A.

Detailed Description of the Preferred Embodiments

5 Referring to Fig. 1, there is illustrated a toothbrush, generally 10, having a handle, generally 11, including a brush generally 12 attached thereto on the top surface, generally 14, of the handle 11. The handle 11 includes a signal (e.g., sound or light) generating device, 10 generally 15, which is preferably embedded within the handle as illustrated. The signal generating device 15 is electrically connected to a pair of conductive leads 16a and 16b which, in turn, are electrically connected to spaced contacts 17a and 17b, respectively, as illustrated. 15 Most preferably, the sound generating device 15, the electrically conductive leads 16a and 16b and much of the spaced electrical contacts 17a, 17b are all embedded within the handle 11 as illustrated. In a preferred embodiment of the invention, only the surface 18 of the spaced contacts 20 is exposed and is flush with the upper surface 14 of the handle 11. In a highly preferred embodiment of the invention, the spaced contacts 17a and 17b include a layer of gold or other substantially inert conductive material on the surface 18.

25 As illustrated in Figure 1, the spaced electrical contacts may be positioned in close proximity to the brush 12, beneath the bristles, such that the contacts themselves never actually touch the user of the toothbrush 10. In this mode, the toothbrush 10 will continue to generate 30 sound or other signal so long as the brush portion 12 remains wet, bridging the contacts 17a and 17b.

In another preferred embodiment of the invention, Figure 2, the contacts 18 are exposed on the side 19 of the handle 11 opposite the side containing the brush 12. In 35 this embodiment, the spaced contacts allow the sound

generating unit 15 to operate any time the back surface 19 of the toothbrush contacts the inside of the mouth, water, saliva, etc. In this embodiment, the toothbrush, because of the relative non-wetability of the material (generally a polymeric material) used to manufacture the handle 11, will provide for a nearly instantaneous disconnection of the electrical circuit bridged by the contacts once the contacts are removed from a wet environment.

The contacts 17a and 17b are preferably tightly fitted in the material comprising the toothbrush 10, for example, by press fitting or interference fitting.

The signal generating device 15 employed is not critical to the invention, and may be a circuit such as that described in co-pending U.S. Patent Application Serial No. 07/947,721, filed September 18, 1992, incorporated in its entirety by reference herein.

Preferred circuit diagrams for the signal generating device of the present inventions are illustrated in Figures 16-18.

The circuit, as illustrated in Figure 16, is based on the TLC555 IC Timer from Texas Instruments. CMOS 555-type oscillators from other manufacturers could also be used. The circuit of Fig. 16 is configured in the astable mode, with frequency determined by the combination of resistors R1 and R2 plus a timing capacitor C1. The values of these components would be chosen for the desired frequency according to the formula:

$$f = \frac{1.49}{(R1 + 2 \cdot R2) \cdot C1}$$

Battery drain can be minimized by changing the ratio of R1 and R2 to set the duty cycle of the output waveform.

When the signal generating device 15, and contacts and contacts 18 are dry, resistor R3 pulls the RESET pin low, inhibiting oscillation. R3 is generally

between 100K and 10M ohms, the exact value selected being low enough to prevent false triggering yet high enough for adequate sensitivity. When wetness bridges the spaced contacts 18 of the signal generating device 15, current flows across the device and causes the voltage of the RESET pin to approach that of V+ allowing oscillation. Resistor R4 is used to limit current flow through the device and is generally in the range of 5 to 100 ohms.

The circuit in Figure 17 also uses the TLC555 IC Timer for T1, but is configured in a monostable mode and may also be used with the sensing device of the invention. The duration of the single output pulse is determined by the timing components R5 and C1 according to the formula

$$t_o = 1.1 * (R5 * C1)$$

The TRIGGER pin is tied to the signal generating device 15 and V+ through R3, chosen as for the circuit in Figure 16 to be large enough to prevent accidental triggering, yet low enough for adequate sensitivity. When the contacts for the sound generating device are dry, TRIGGER is held by R3. Upon wetting of the sensing device, that is, bridging of the contacts 18 by wetness or other aqueous or conductive fluid, or other electrically conductive material such as human skin, lips, tongue, gums, teeth, and mouth, human mucosal surfaces, current flow across the sensor pulls TRIGGER low, initiating a timing sequence.

The circuits in Figure 16 and Figure 17 add capacitor C2, for operating stability. The signal device 26 in both Figures 16 and 17 can be any of several devices including a piezo transducer, buzzer, LED, miniature radio transmitter, incandescent lamp, etc.

The circuit in Figure 18 is a discrete component multivibrator circuit, which may also be used by the signal generating device 15 of the invention. In the dry state, transistor Q1 is biased in the off state by the 3.9M

resistor and Q2 is biased on causing the collector voltage of Q1 to approach V+. When first wet, the sensing portion 18 of the circuit forces Q1 to turn on, which in turn causes Q2 to be turned off as its base voltage falls. But
5 Q1 and Q2 are tied together such that after a short period of time they will switch states alternately, i.e. they will oscillate, as long as there is current flow through the sensing device.

The electrical leads 16a and 16b may comprise any
10 conductive material capable of completing the circuit upon connection of the spaced contacts by a wet or electrically conductive environment. Examples include: metallic wire, conductive fiber, conductive inks, conductive dyes, conductive paints and mixtures thereof. In the case of the
15 use of conductive inks or paints, it would be feasible to print the ink or paint directly on the exterior surface 14 or 19 of the toothbrush handle 11, avoiding the need to embed the electrical leads within the handle 11. A disadvantage of printing conductive ink or paint onto the
20 handle, however, is the tendency of such inks or paints to wear-off or rub-off after time, depending on the severity of use to which the device is put.

In the case in which the conductive leads 16a and 16b are embedded within the handle, the handle acts as in
25 electrical insulator, and it is important to maintain a space 20 between the conductive leads along the length of the handle 11, as illustrated in Figure 3.

In a highly preferred embodiment of the invention, the signal generating device 15 includes a chip
30 capable of generating a plurality of sounds, such as different songs or portions of songs, or different phrases. When such a sound generating device is used, it is preferable to include a timing means for dictating a time interval between different sounds generated by the sound
35 generating device. The timing means, should, for example,

initiate the first sound substantially simultaneously with the first completion of the circuit upon the spaced contacts entering a wet environment or being otherwise electrically bridged. Following the first sound generation, the timer circuit should allow the sound generating device to pause for a time interval of, for example, several seconds or more prior to generating the next sound, which may be the same or different relative to the previous sound generated.

As an example, in the case in which a phrase or series of phrases is used, the sound generating device can be programmed to initiate as the first sound a phrase such as "Let's brush" followed several seconds thereafter with a phrase such as "Up and down, back and forth", followed several seconds thereafter with yet another phrase such as "Don't forget the back teeth", and ending with a phrase such as "Don't forget to rinse." When phrases are used, the toothbrush can be personalized with a particular user's name to more directly encourage the user to brush his/her teeth on a regular basis. Sound chips and circuits such as described herein for use in preparing a signal generating device with phrases and songs can, with the benefits of the teachings disclosed herein, be obtained from American Ceramcraft, 65 Passaic Avenue, Kearny, New Jersey 07032.

As illustrated in the Figures, in a highly preferred embodiment of the invention the signal generating device 15 is positioned at the end 21 of the handle 11 opposite the brush end 12. This allows for the toothbrush 10 to be more evenly balanced and further provides the advantage of an end stop for small hands gripping the handle 11.

In a highly preferred embodiment of the invention, as illustrate in Figure 4, the sound generating device 15, which generally includes a piazo or other sound transducer, is positioned with the flat face 22 of the

sound transducer normal to the handle 11, creating a stand 23 for allowing the toothbrush 10 to be stored on end on a horizontal surface, as illustrated in Figure 5.

5 The toothbrush handle may further be designed to include a decorative or ornamental shape pleasing to children, such as popular cartoon characters and the like.

In addition to providing an enlarged end with a base 23 for standing the toothbrush on end, it is also preferable to include a weight 24 on the end of the
10 toothbrush 10 to further enable the toothbrush 10 to be stood on that end.

The signal generating device 15 is preferably powered by a battery, such as a 1.5 button cell or a 3 volt camera-type battery. More than one battery can, of course,
15 be used, depending on circuit requirements. In a highly preferred embodiment of the invention, the battery is replaceable. In such an embodiment the handle 11 includes a substantially water-tight cover for accessing the battery for replacement. Such a cover may include a slidable cover
20 that engages the handle revealing a battery port. Alternatively, an elastomeric (e.g., rubber) plug may be used as a substantially watertight cover for covering the battery port and for providing access thereto for battery replacement.

25 In the embodiment of the toothbrush illustrated in Figures 1-3, it is preferable to include a mirror 25 on at least one side of the enlarged end 21 of the handle 11. Such a mirror 25 can be used by the toothbrush user to inspect his or her teeth for cleanliness.

30 In addition to the use of substantially round sound transducers, it is also possible to use elongated sound transducers to provide a more streamlined appearance to the handle 11 when a sound generating device 15 is embedded in the handle in the orientation of Figures 1-3.

In addition to providing a toothbrush as described, in another preferred embodiment of the invention, the toothbrush includes a cup 30 also having a sound generating device 15 embedded therein with a pair of spaced electrical contacts 18 preferably facing the inside of the cup, as illustrated in Figure 6. In this device, it is preferred to embed the sound generating device in the base of the cup 31, as well as the spaced contacts as illustrated. The signal generating device 15 of this embodiment preferably includes a delay timer circuit which delays the onset of a signal generation until some time after the cup is filled with water or other conductive fluid and/or after the cup is emptied of conductive fluid. For example, the delay circuit would allow the user to fill the cup with water, rinse and empty the cup, followed with a phrase such as "Well done, see you next time." Alternatively, the cup could delay a "reward" signal until, and only if, the cup is drained of conductive fluid, such that the bridged contacts are disconnected, encouraging a child, for example, to finish his milk.

As illustrated in Figure 7, the spaced contacts 18 may be positioned in the center of the base 31 of the cup 30. As further illustrated in Figure 8, the bottom surface 32 of the cup may include a sound-permeable cover such as illustrated, including a grid for allowing sound to leave the base of the cup 31.

In another preferred embodiment of the invention, a cup 30 having a straw 40 integrally connected thereto includes a signal generating device for generating a signal once fluid is drawn through the straw, as illustrated in Figure 11.

As illustrated in Figure 9, the straw 40 may be free-standing relative to the cup 30, and may have attached thereto a signal generating means 15, the straw further including a pair of spaced electrical contacts 18

internally disposed with respect to the straw 40 so as to be contacted by the fluid drawn through the straw 40 by a user thereof. The straw 40, which may be fabricated of a polymeric material known to those skilled in the art, provides electrical insulation for the spaced contacts 18. The spaced contacts 18 are electrically connected to the signal generating device 15, such as previously described, and complete an electrical circuit for initiating a signal to be generated by the signal generating device when the spaced electrical contacts 18 are bridged by a conductive fluid drawn through the straw 40.

Examples of conductive fluids that will initiate the signal when drawn through the straw include, for example, all aqueous fluids, milk, juice, soft drinks, alcoholic beverages, water, etc.

In a highly preferred embodiment of the invention, as illustrated in Figure 9, the straw 40 includes a weighted end 41 which permits the straw 40, once placed in a fluid, for example, contained within a cup 30, to be retained within the fluid or in the cup. The weighted end 41 may, for example, include an enlarged weighted section 42 at the end of the straw, as illustrated in Figure 10.

In a highly preferred embodiment of the invention, the straw 40 is attached to a cup 30 for holding the conductive fluid. This may be accomplished by a series of clips fastened to the cup 30 for accepting the straw 40, or it may be accomplished by forming the straw 40 integrally with the cup 30, as illustrated in Figures 11 and 12.

In yet another preferred embodiment of the invention, illustrated in Figure 13, a floatable object, generally 50, containing a signal generating device 15, such as previously disclosed, includes at least two spaced electrical contacts 18 electrically insulated from one

another by the floatable object, and exposed on an external surface 52 of the floatable object to a conductive fluid 51 in which the floatable object 50 floats. The spaced electrical contacts 18 are electrically connected to the
5 signal generating device 15 in a manner similar to that previously disclosed, completing an electrical circuit for initiating a signal such as a sound or light when the contacts 18 are bridged by the conductive fluid 51 in which the floatable object floats.

10 Preferably, as illustrated, the sound generating device 15 is disposed internally relative to the floatable object 50 external surface 52 and is positioned in a substantially water-tight manner with respect to the electrically conductive fluid 51 in which the floatable
15 object 50 floats.

In one preferred embodiment of the invention, the spaced electrical contacts 18 are positioned below the water line 53 of the floatable object 50 such that a continuous or semi-continuous signal is generated by the
20 floatable object 50. In another embodiment of the invention, as illustrated in Figure 13, at least one of the spaced electrical contacts 18 is positioned below the waterline 53 of the floatable object and at least one of the spaced electrical contacts 18 is positioned above the
25 waterline 53. In this embodiment, the user of the floatable object may "dunk" the device into the electrically conductive fluid 51 to initiate the signal.

In still another embodiment of the invention, the spaced electrical contacts 18 are positioned above the
30 waterline of the floatable object such that substantially the entire object 50 must be "dunked" into the electrically conductive fluid 51 to initiate the signal.

In addition to the object illustrated (a duck), other floatable/immersible toys may advantageously use the
35 signal generating device of the invention, including, by

way of example but not limitation, boats, dolls, fish, birds, snakes, frogs, whales, etc.

In yet another preferred embodiment of the invention, the floatable object signal generating device 15
5 is adapted to initiate a second signal from a second floatable object containing a second signal generating device and positioned proximate the floatable object 50. Such response can be initiated using known methods, for example, radio frequencies and/or sound frequencies capable
10 of initiating a signal from a signal generating device within the second floatable object in response to the selected radio/sound frequency generated by the floatable object 50.

It is highly preferred that the spaced electrical
15 contacts 18, while being exposed to the electrically conductive fluid 51 on the external side 52 of the floatable object 50, maintain a water-tight barrier relative to the internally disposed signal generating device 15. This may be accomplished in a number of ways,
20 including utilizing as the spaced electrical contacts an electrically conductive ink, known in the art of conductive materials, which can be applied to the external surface 52 of the floatable object, as is now apparent from the present disclosure. Alternatively, the spaced electrical
25 contacts 18 may comprise an electrically conductive elastomeric plug, fabricated of an electrically conductive elastomer, which plug may be passed through the shell of the floatable object while maintaining a watertight seal therewith.

30 In yet another preferred embodiment of the invention, a garment, generally 60, illustrated in Figure 14, capable of generating a signal in response to an electrically conductive fluid impinging on the garment is provided, the garment 60 having associated therewith a
35 signal generating device 15, such as previously described,

the signal generating device being electrically connected to one or more spaced electrical contacts 18 positioned on the garment, such as via electrical leads 16, and electrically insulated from each other and from a wearer of the garment by the garment 60 itself. The spaced electrical contacts 18 complete an electrical circuit for generating the signal from the signal generating device when the spaced electrical contacts 18 are bridged by the electrically conductive fluid.

10 The signal generated by the garment may be either audible as previously discussed, or may be a visual signal.

For example, in the case of a visual signal, the signal may comprise a brilliant LED lamp, known to those skilled in the art of visual signals.

15 The spaced electrical contacts 18, leads 16, and signal generating device 15 may be connected to the garment in any number of ways. For example, the signal generating device may be connected to the garment via snaps or may be sewn into the garment or may be positioned in a closable 61 pocket in the garment 60. The leads 16 may be sewn into a lining in the garment 60.

20 The spaced electrical contacts 18 may be fabricated of any electrically conductive material, including metal wire, snaps, electrically conductive nature or synthetic fiber, electrically conductive ink, electrically conductive paint, electrically conductive dye, and mixtures thereof. As illustrated, when the spaced contacts 18 comprise an electrically conductive applique, such as ink, dye, or electrically conductive tape, a variety of patterns may be placed on the garment 60, such as targets, camouflage, etc., allowing the user of a water pistol to aim and shoot water at the target. When water (or other electrically conductive fluid) impinges on the garment, the water bridges the spaced electrical contacts

18 and causes the signal generating device 15 to generate a signal, such as an audible or visual signal as previously described.

The garment 60 may be fabricated of any known material or fabric, woven or non-woven, including, by way of example, but not limitation, plastic, nylon, polyester, polypropylene, Gortex®, leather, cotton, wool, linen, rayon and blends and mixtures thereof. In a highly preferred embodiment, the garment fabric is a waterproof, substantially non-wettable material, such as nylon, which readily accepts electrically conductive inks applied thereto, and which allows aqueous solutions to quickly run off and/or evaporate, allowing repeated bridging of the spaced contacts by repeated "hits", for example from a water pistol.

The garment 60 may be any number of objects that can be worn, such as hats, shirts, vest, pants, swimwear, jackets, coats, rainwear, socks, shoes, boots, gloves, headbands, armbands, wristbands, and legbands, etc.

In a highly preferred embodiment of the invention, a different signal is generated by the signal generating device 15 depending on the location on the garment 60 in which the electrically conductive fluid impinges on the garment 60. For example, when the garment comprise a "military style" vest to be used in "war games," a target generally 62 in the heart area on the vest might initiate a signal indicative of a serious "hit," whereas a second signal may indicate a less serious "hit" if a pair of spaced electrical contacts 18 is bridged at a location relatively remote from the more serious heart location.

In a highly preferred embodiment of the invention, the signal generating device further includes a counter device for keeping score by keeping track of both the number of "hits," or number of times a pair of spaced contacts is bridged, as well as the value of each "hit", as

determined by the location of the spaced contacts, relative to the wearer, that have been bridged.

The signal generating device 15 preferably includes an amplifier or other speaker capable of
5 generating a sufficiently loud signal when a sound signal is employed. The signal generating device 15 is also preferably housed within a padded housing for wearer comfort and is preferably mounted on a flexible circuit board to further insure wearer comfort.

10 In another highly preferred embodiment of the invention, illustrated in Figure 15, a toilet 70 is provided in which the toilet includes a signal generating device 15 similar to that previously described, the signal
15 generating device 15 including spaced electrical contacts 18, electrically insulated from one another by the toilet, and disposed internally with respect to the toilet, the spaced electrical contacts 18 being electrically connected to the signal generating device and completing an
20 electrical circuit for generating a signal from the signal generating device when the spaced electrical contacts 18 are bridged by an electrically conductive material, such as urine. As discussed previously, this signal may be either audible or visual.

As also previously discussed, the spaced
25 electrical contacts 18 may be fabricated of any electrically conductive material, such as those selected from the group consisting of electrically conductive metal, conductive synthetic material, conductive ink, conductive dye, and conductive paint.

30 In a highly preferred embodiment of the invention, the signal generating device 15 is disposed externally of the toilet 70 so as to be protected from the harsh environment to which the interior of the toilet is exposed. In one such embodiment, illustrated in Figure
35 19, the signal generating device 15 may be removably

disposed on the toilet with use of conductive snaps 71, as illustrated, which are electrically connected to the spaced electrical contacts 18, for example, by leads 16, which insure a water-tight barrier between the spaced electrical contacts 18, the inner wall 72 of the toilet, and the signal generating device 15.

In another highly preferred embodiment of the invention, the toilet 70 comprises a urinal, such as for use in toilet training of young boys, the urinal 70 having spaced electrical contacts 18 disposed within the urinal corresponding a target area 73 for the user of the urinal to direct a stream of urine. When used in this manner, the toilet 70 is preferably fabricated of a polymeric material, or plastic, known in the art. Such material is lightweight, easily molded, and electrically insulating.

The toilet 70 may be either free standing, including a removable pot on catch basin (not shown) or may be positionable on a standard commode, using one or more locking flanges 73 for removeably positioning the toilet 70 on the open seat 74 of the commode. In the embodiments of Figures 15 and 19, the toilet preferably includes a collar or neck 75 having an opening 76 therein, the neck 75 being adapted to extend into the commode to which the toilet 70 is attached via the locking flanges 73 attached to the seat 74. Urine (or feces) can thus run down the vertical inner wall 72 of the urinal 70, through the neck opening 76 and into the commode for flushing, as indicated by the arrows in Figure 19.

It is, of course, understood that the above are merely preferred embodiments of the invention and that various changes and alterations can be made to these preferred embodiments without departing from the spirit and broader aspects of the invention, as set forth in the appended claims. The claims are to be interpreted in

accordance with the principles of patent law including,
without limitation, the doctrine of equivalents.

We Claim:

1. A toothbrush (10) capable of generating a signal, said toothbrush (10) including a handle (11) and a brush (12) attached thereto, said toothbrush (10) including at least two spaced electrically conductive contacts (17a, 17b, 18), said contacts adapted to be electrically bridged by an electrically conductive material, said toothbrush (10) further including signal generating means (15) electrically connected to said spaced contacts (17a, 17b, 18) for generating said signal when said spaced electrically conductive contacts (17a, 17b, 18) are bridged by said electrically conductive material.

2. The toothbrush (10) of claim 1 wherein said signal generating means (15) is embedded within said handle (11).

3. The toothbrush (10) of claim 1 wherein said spaced electrically conductive contacts (17a, 17b, 18) are positioned proximate said brush (12), on the same side of said handle (11) as said brush (12) and proximate bristles comprising said brush (12).

4. The toothbrush (10) of claim 1 wherein said spaced contacts (17a, 17b, 18) are positioned proximate said brush (12), on the opposite side of said handle (11) relative to said brush (12).

5. The toothbrush (10) of claim 1 wherein said spaced electrically conductive contacts (17a, 17b, 18) are electrically connected to said signal generating means (15) by electrical leads (16a, 16b) comprising material selected from the group consisting of metallic wire, conductive fiber, conductive ink, conductive paint, and mixtures thereof.

6. The toothbrush (10) of claim 5 wherein said electrical leads (16a, 16b) comprise conducting wires embedded in and along said handle (11), and spaced apart

(20) by electrically insulating material comprising said handle (11).

7. The toothbrush (10) of claim 1 wherein said signal generating means (15) generates audible sounds.

5 8. The toothbrush (10) of claim 7 wherein a plurality of phrases is generated by said signal generating means (15) and the generation of each said phrase is separated by a time interval dictated by timer means in said signal generating means (15).

10 9. The toothbrush (10) of claim 7 wherein said audible sounds comprise musical tunes.

 10. The toothbrush (10) of claim 9 wherein said musical tunes comprise a plurality of different song passages, the generation of each said song passage being
15 separated by a time interval dictated by timing means in said signal generating means (15).

 11. The toothbrush (10) of claim 2 wherein said signal generating means (15) is embedded at the end of said handle (11) opposite said brush (12).

20 12. The toothbrush (10) of claim 11 wherein said end (21) of said handle (11) having said signal generating means (15) embedded therein has an ornamental shape.

 13. The toothbrush (10) of claim 1 wherein said handle (11) is adapted with stand means (23) for allowing
25 said toothbrush (10) to be stood on end on a horizontal surface.

 14. The toothbrush (10) of claim 1 wherein said signal generating means (15) includes replaceable battery means (V+) for powering said signal generating means (15).

30 15. The toothbrush (10) of claim 14 wherein said handle (11) includes a substantially watertight cover for accessing said battery means (V+) for replacement.

 16. The toothbrush (10) of claim 11 wherein at least one side of said handle (11) includes mirror means
35 (25) proximate said signal generating means (15).

17. The toothbrush (10) of claim 1 wherein said electrically conductive material is selected from the group consisting of human skin, human lips, human tongue, human gums, human teeth, the human mouth, human mucosal surfaces,
5 and aqueous solutions.

18. A cup (30) including a signal generating means (15), said cup (30) further including spaced electrical contacts (18) electrically insulated from one another by said cup (30), and exposed on a surface thereof
10 to an electrically conductive fluid contained by said cup (30), said spaced electrical contacts (18) being electrically connected to said signal generating means (15) and completing an electrical circuit for generating a signal when said spaced electrical contacts (18) are
15 bridged by said electrically conductive fluid.

19. The cup (30) of claim 18 wherein said signal generating means (15) includes delay means for delaying the initiating of said signal for a time interval following bridging and/or disconnecting of said spaced contacts (18).

20. A straw (40) having attached thereto a signal generating means (15), said straw (40) further including a pair of spaced electrical contacts (18) internally disposed with respect to said straw (40) so as to be contacted by an electrically conductive fluid being
25 drawn through said straw (40) by a user thereof, said straw (40) electrically insulating said spaced contacts (18) from one another, said spaced electrical contacts (18) being electrically connected to said signal generating means (15) and completing an electrical circuit for initiating a
30 signal generated by said signal generating means (15) when said spaced electrical contacts (18) are bridged by said electrically conductive fluid drawn through said straw (40).

21. The straw (40) of claim 20 wherein one end
35 (41) of said straw (40) corresponding with the end (41)

placed in said electrically conductive fluid is weighted to retain said straw (40) within said electrically conductive fluid.

22. The straw (40) of claim 20 wherein said
5 straw (40) is attached to a cup (30) for holding said conductive fluid.

23. A floatable object (50) including signal
generating means (15), said floatable object (50) further
including at least two spaced electrical contacts (18)
10 electrically insulated from one another by said floatable
object (50) and exposed on an external surface of said
floatable object (50) to an electrically conductive fluid
(51) in which said floatable object (50) floats, said
spaced electrical contacts (18) electrically connected to
15 said signal generating means (15) and completing an
electrical circuit for initiating a signal generated by
said signal generating means (15) when said spaced
electrical contacts are bridged by said electrically
conductive fluid (51) in which said floatable object (50)
20 floats.

24. The floatable object (50) of claim 23
wherein said signal generating means (15) is disposed
internally relative to said floatable object (50) and
disposed within said floatable object (50) in a
25 substantially watertight manner with respect to said
electrically conductive fluid (51).

25. The floatable object (50) of claim 24
wherein said spaced electrical contacts (18) are positioned
below the water line (53) of said floatable object (50).

26. The floatable object (50) of claim 24
30 wherein at least one of said spaced electrical contacts
(18) is positioned below the water line (53) of said
floatable object (50) and at least one of said spaced
electrical contacts (18) is positioned above said water
35 line (53).

27. The floatable object (50) of claim 24 wherein said spaced electrical contacts (18) are positioned above the water line (53) of said floatable object (50).

5 28. The floatable object (50) of claim 23 wherein said signal generating means (15) is adapted to initiate a second signal from a second floatable object (50) containing a second signal generating means (15) when said second floatable object (50) is positioned proximate said floatable object (50).

10 29. The floatable object (50) of claim 24 wherein said spaced electrical contacts (18) form a substantially watertight barrier relative to said internally disposed sound generating means (15).

15 30. The floatable object (50) of claim 29 wherein said spaced electrical contacts (18) comprise electrically conductive material selected from the group consisting of conductive ink, conductive dye, conductive paint, and mixtures thereof, applied to the external surface of said floatable object (50).

20 31. The floatable object (50) of claim 29 wherein said spaced electrical contacts comprise electrically conductive elastomeric plugs passing through the shell of said floatable object (50) and maintaining said substantially watertight seal therewith.

25 32. A garment (60) capable of generating a signal in response to an electrically conductive fluid impinging on said garment (60), said garment (60) having associated therewith a signal generating means (15), said signal generating means (15) being electrically connected
30 to at least two spaced electrical contacts (18) positioned on said garment (60) and electrically insulated from each other and from a wearer of said garment (60) by said garment (60), said spaced electrical contacts (18) completing an electrical circuit for generating said signal
35 from said signal generating means (15) when said spaced

electrical contacts (18) are bridged by said electrically conductive fluid.

33. The garment (60) of claim 32 wherein said signal is audible.

5 34. The garment (60) of claim 32 wherein said signal is visual.

35. The garment (60) of claim 32 wherein said spaced electrical contacts (18) are fabricated of an electrically conductive material selected from the group
10 consisting of electrically conductive metallic wire, fiber, ink, dye, paint, and mixtures thereof.

36. The garment (60) of claim 32 wherein said garment (60) is selected from the group consisting of hats, shirts, vests, pants, swimwear, jackets, coats, rainwear,
15 socks, shoes, boots, gloves, head bands, arm bands, wrist bands and leg bands.

37. The garment (60) of claim 32 wherein different signals are generated by said signal generating means (15) depending on the location on said garment (60)
20 on which said electrically conductive fluid impinges on said garment (60).

38. The garment (60) of claim 32 wherein said signal generating means (15) further includes counting means for recording the number of times said spaced
25 electrical contacts (18) are impinged and bridged by said electrically conductive fluid.

39. A toilet (70) including a signal generating means (15), said signal generating means (15) including spaced electrical contacts (18) electrically insulated from
30 one another by said toilet (70), and disposed internally with respect to said toilet (70), said spaced electrical contacts (18) being electrically connected to said signal generating means (15) and completing an electrical circuit for generating a signal from said signal generating means

(15) when said spaced electrical contacts (18) are bridged by an electrically conductive material.

40. The toilet (70) of claim 39 wherein said signal is audible.

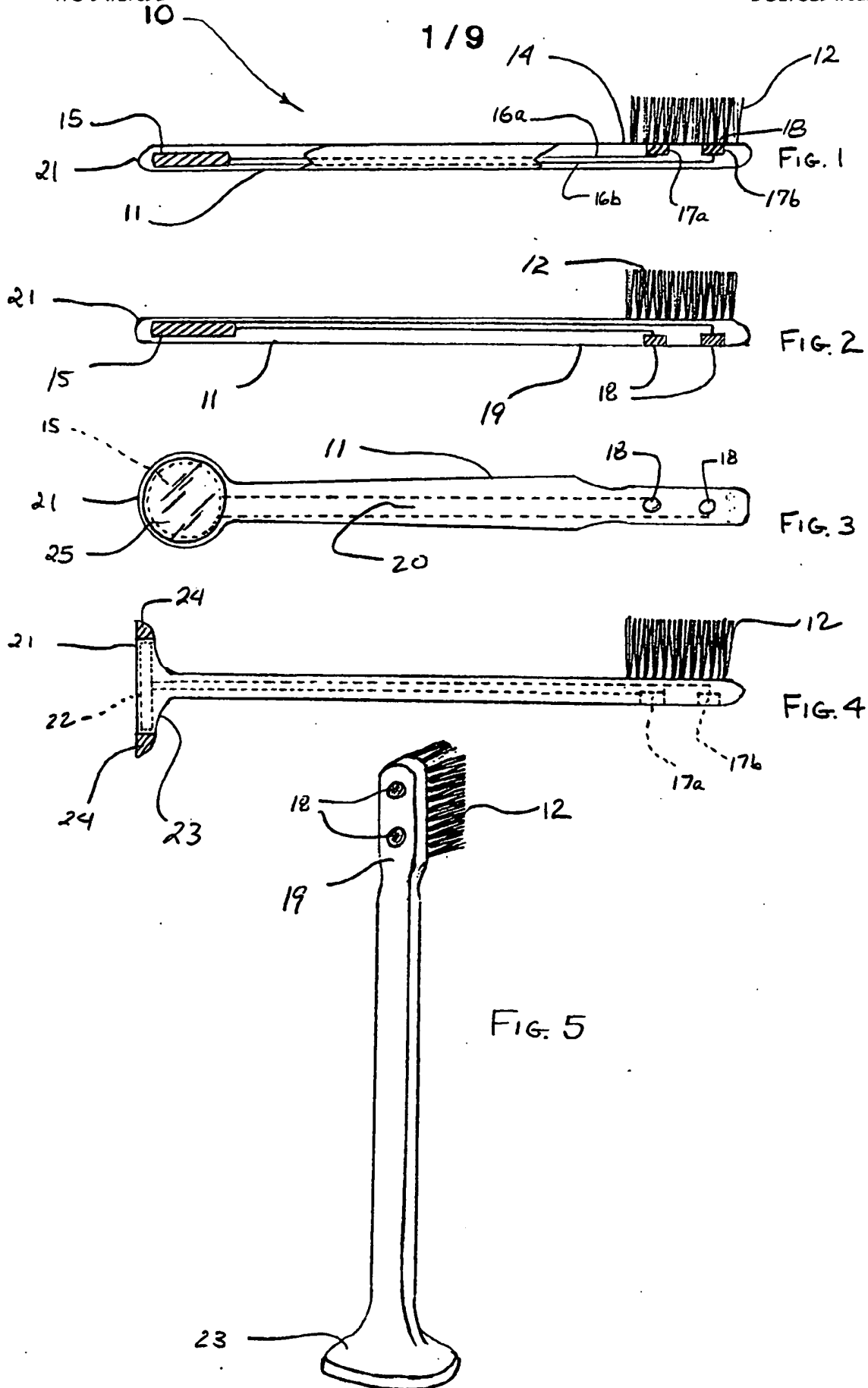
5 41. The toilet (70) of claim 39 wherein said signal is visual.

42. The toilet (70) of claim 39 wherein said spaced electrical contacts (18) are fabricated of material selected from the group consisting of electrically
10 conductive metal, electrically conductive synthetic material, electrically conductive ink, electrically conductive dye, electrically conductive paint and mixtures thereof.

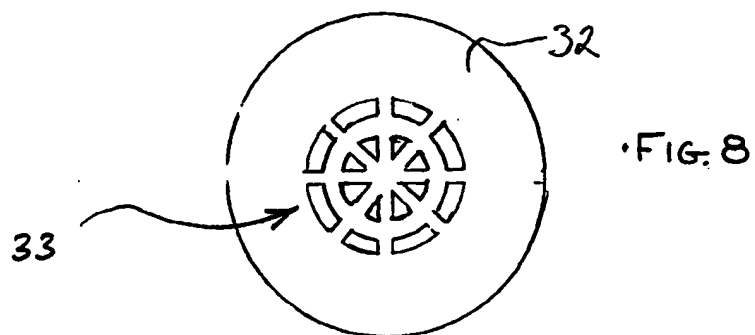
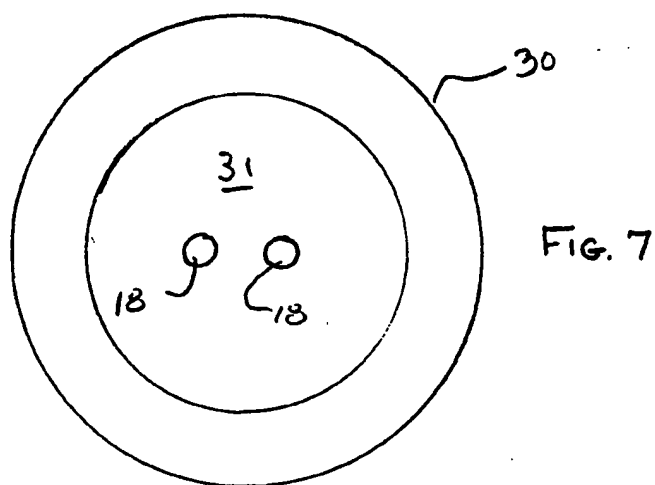
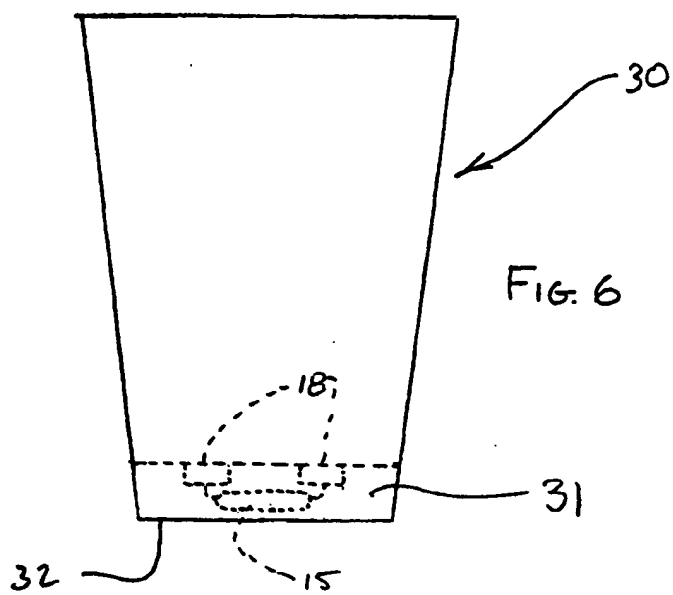
43. The toilet (70) of claim 39 wherein said
15 toilet (70) comprises a urinal (80) and said spaced electrical contacts (18) are disposed within said urinal (80) at a location corresponding to a target (73) area for a user of said urinal (80) to direct urine.

44. The toilet (70) of claim 43 wherein said
20 urinal (80) includes a substantially vertical rear wall (72) connected to an open collar, said open collar having attachment means for removably attaching said urinal (80) to a commode toilet (70) seat, said open collar allowing urine impinging on said rear wall (72) to run down said
25 rear wall (72), through said open collar (75), and into said commode.

45. The toothbrush (10) of claim 1 wherein said signal comprises a visual light signal.



2/9



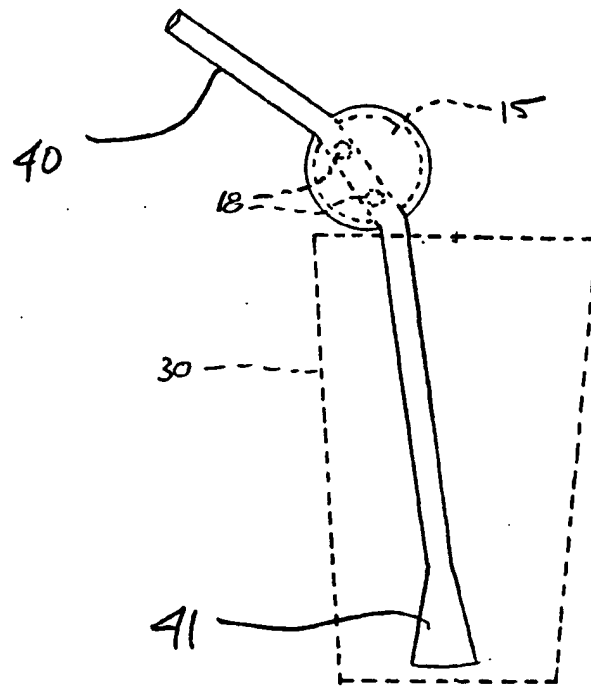


FIG. 9

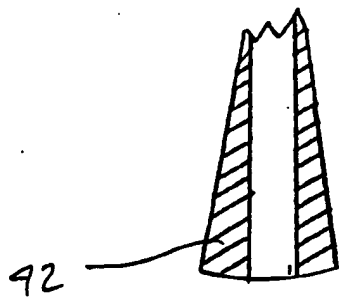


FIG. 10

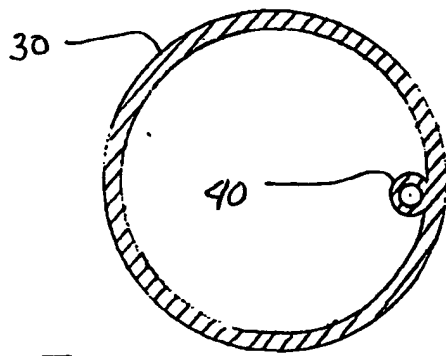


FIG. 12

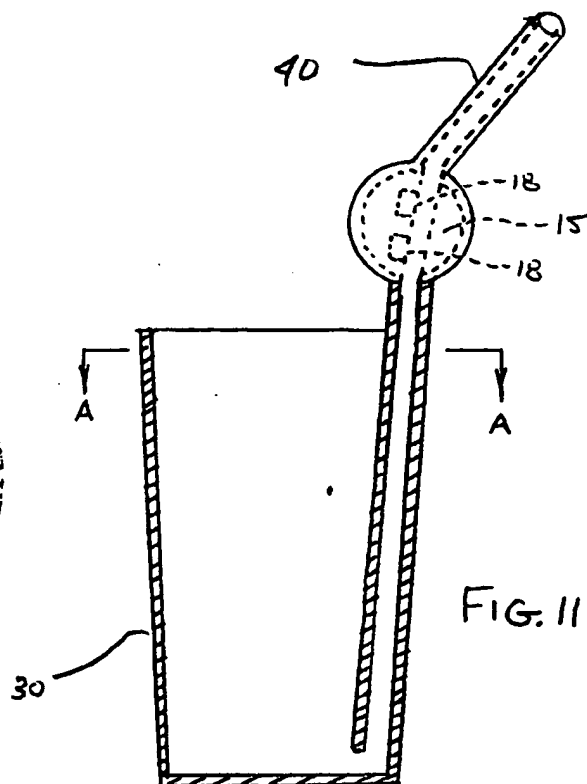
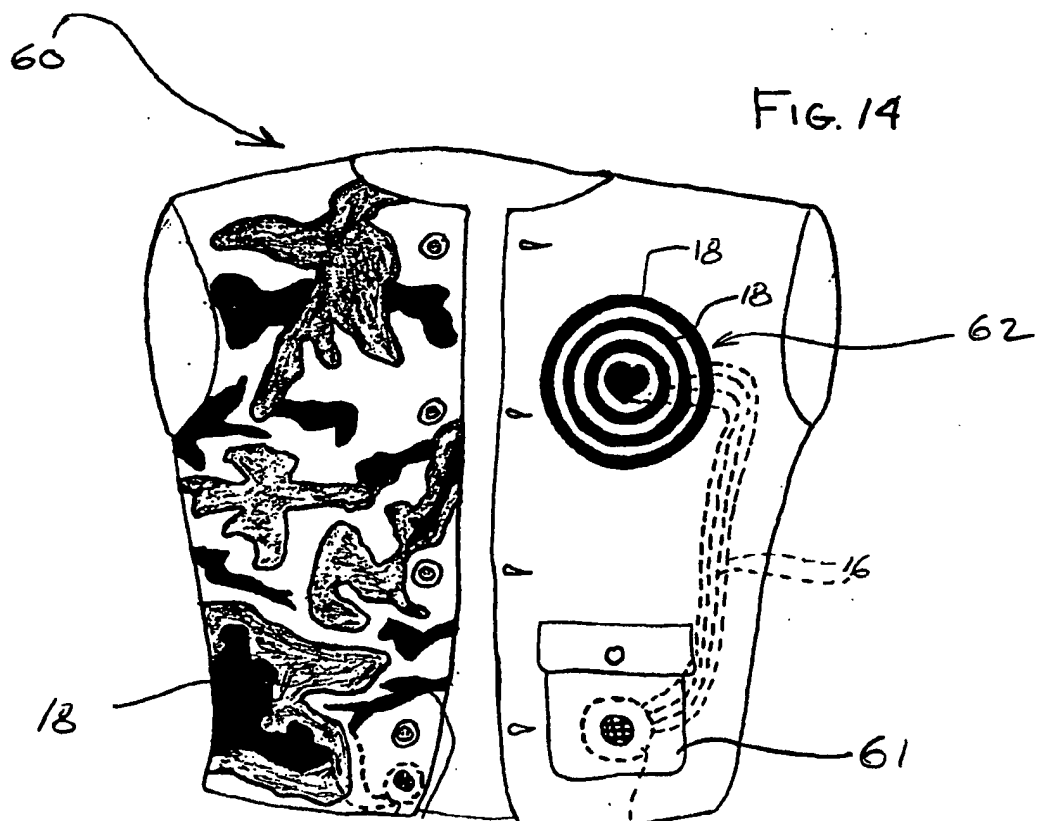
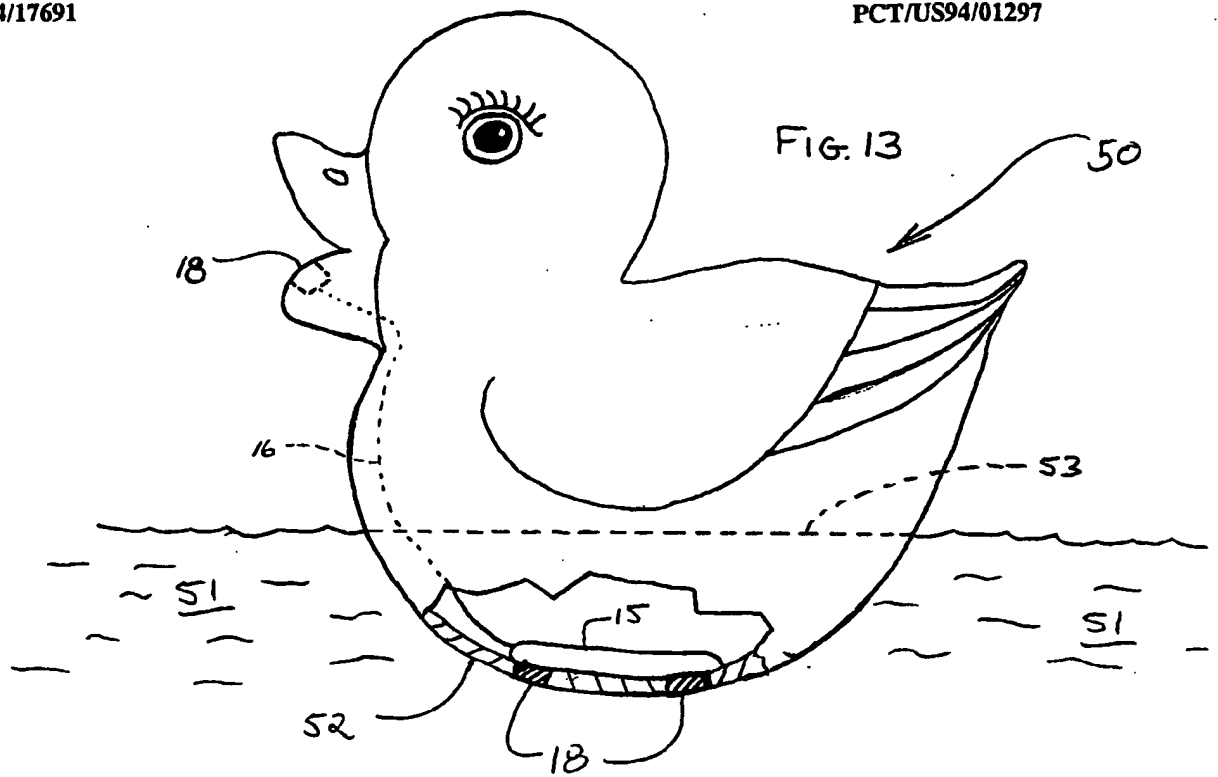
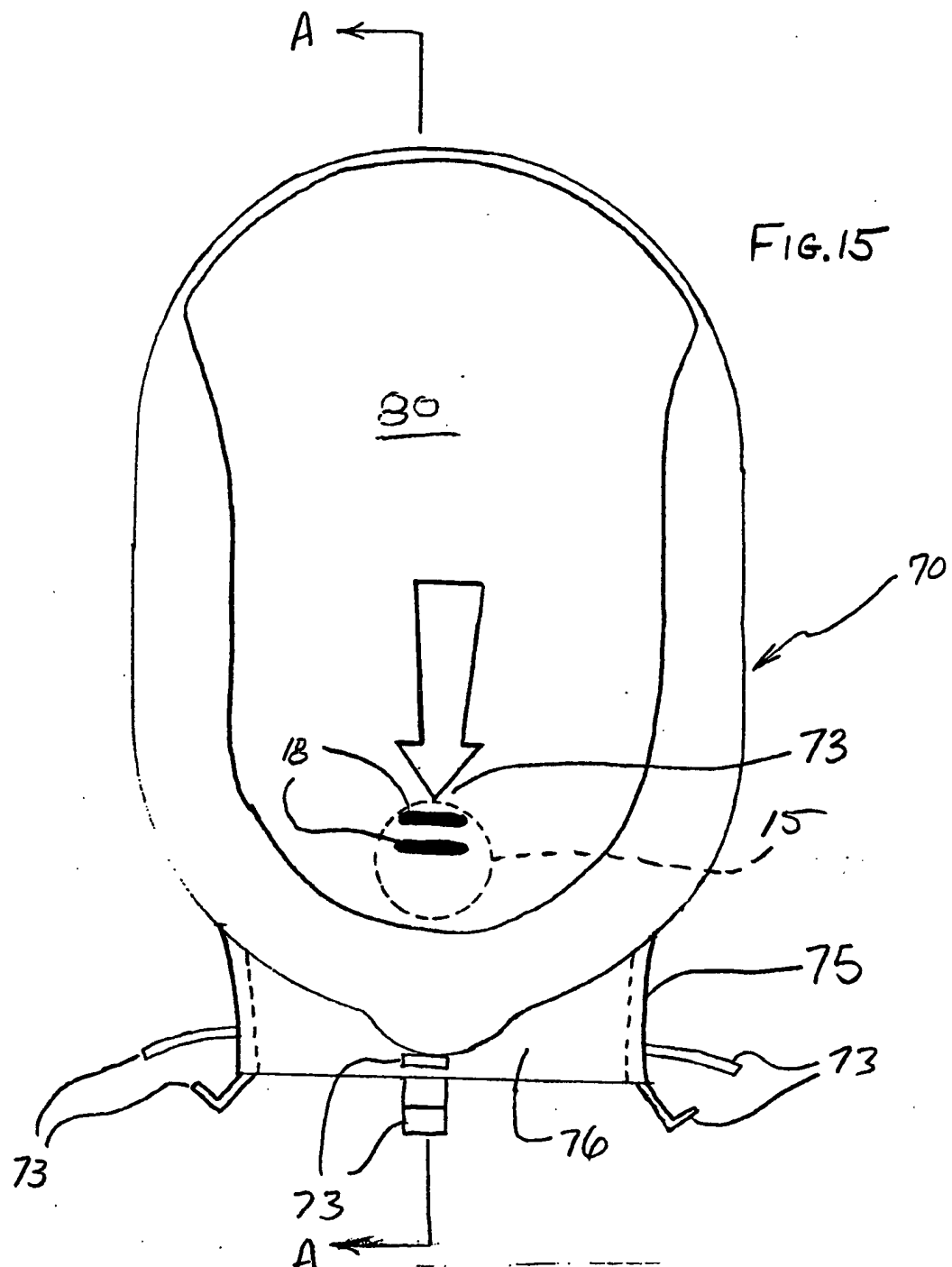


FIG. 11





6 / 9

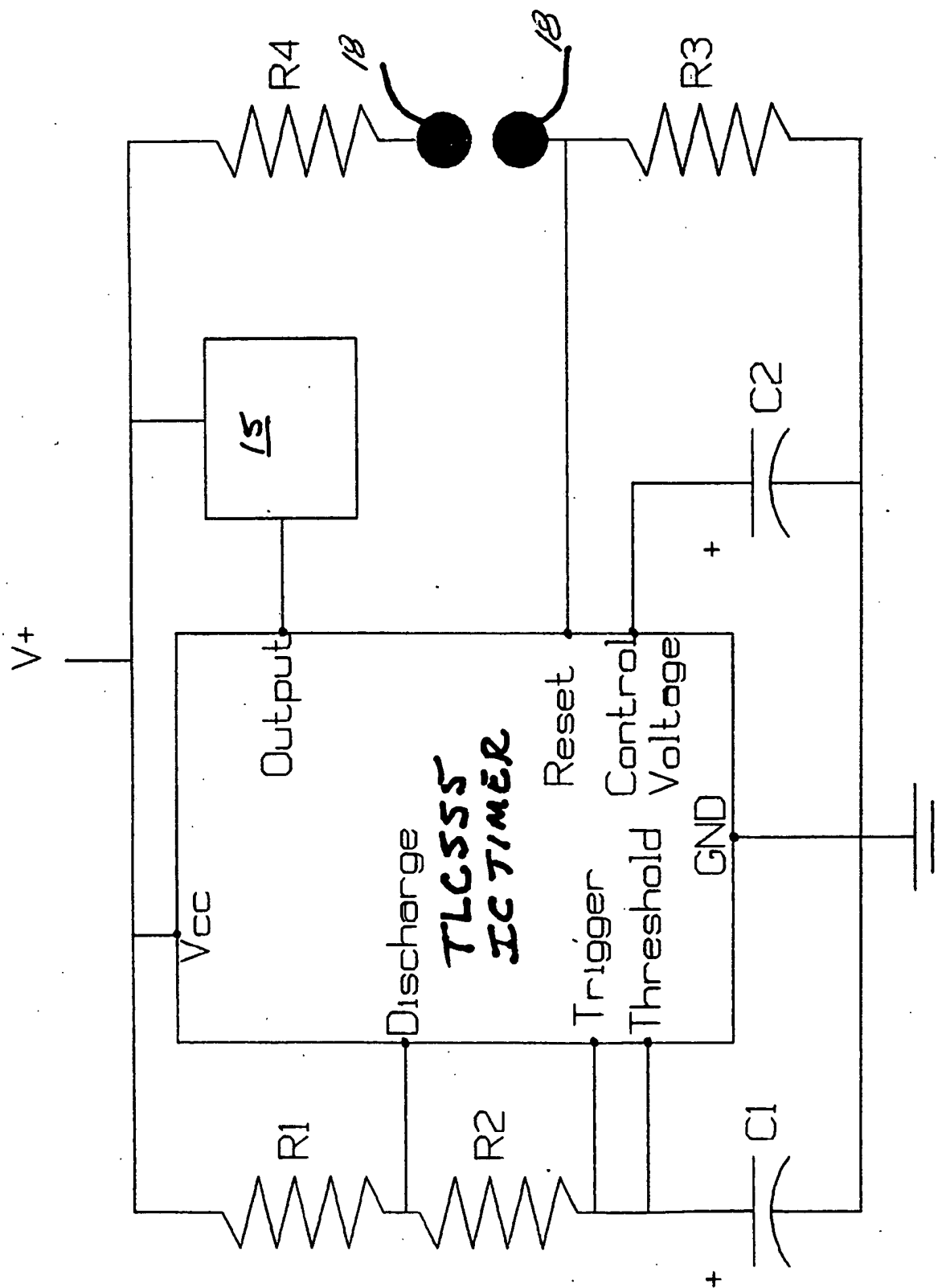


Figure 16

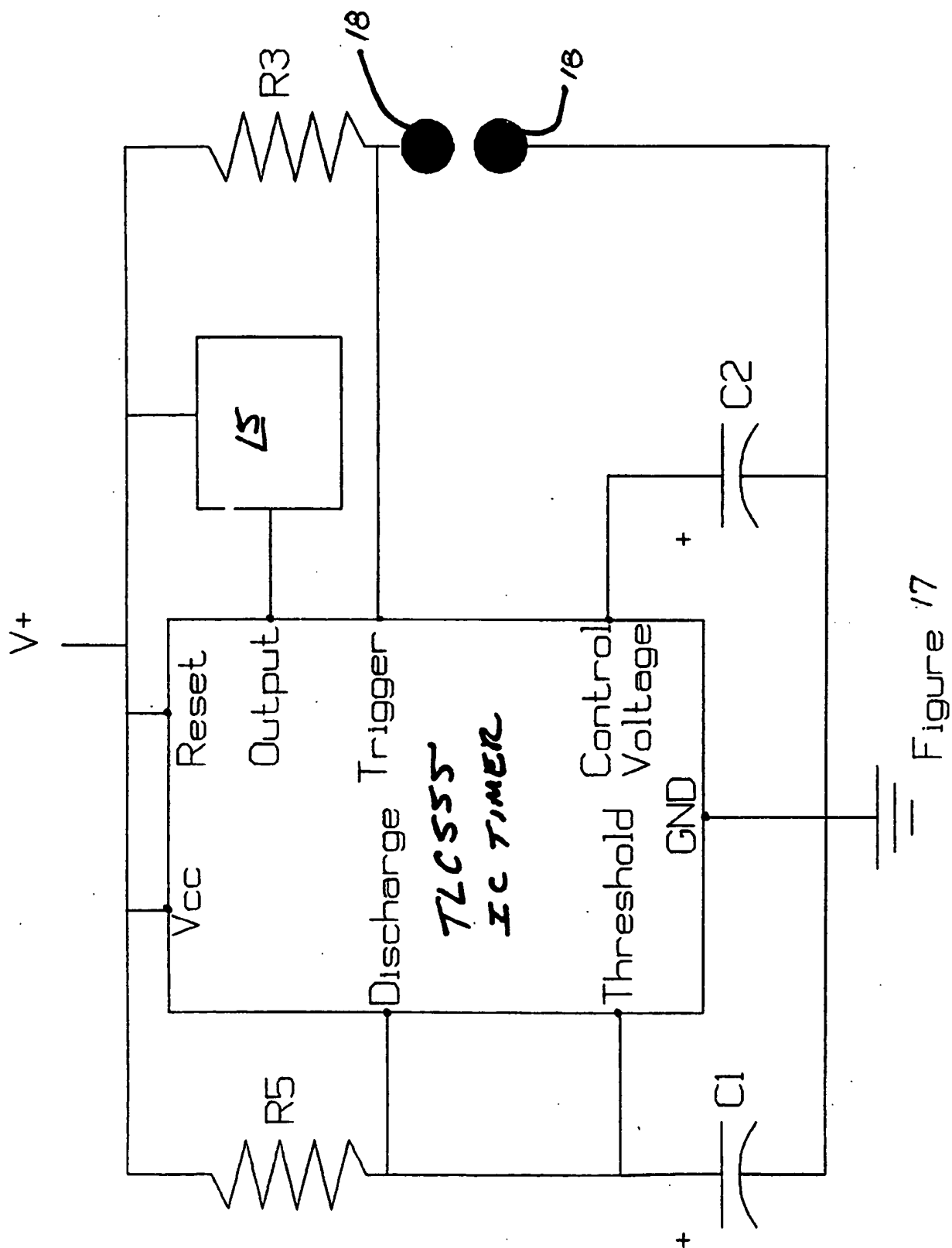


Figure 17

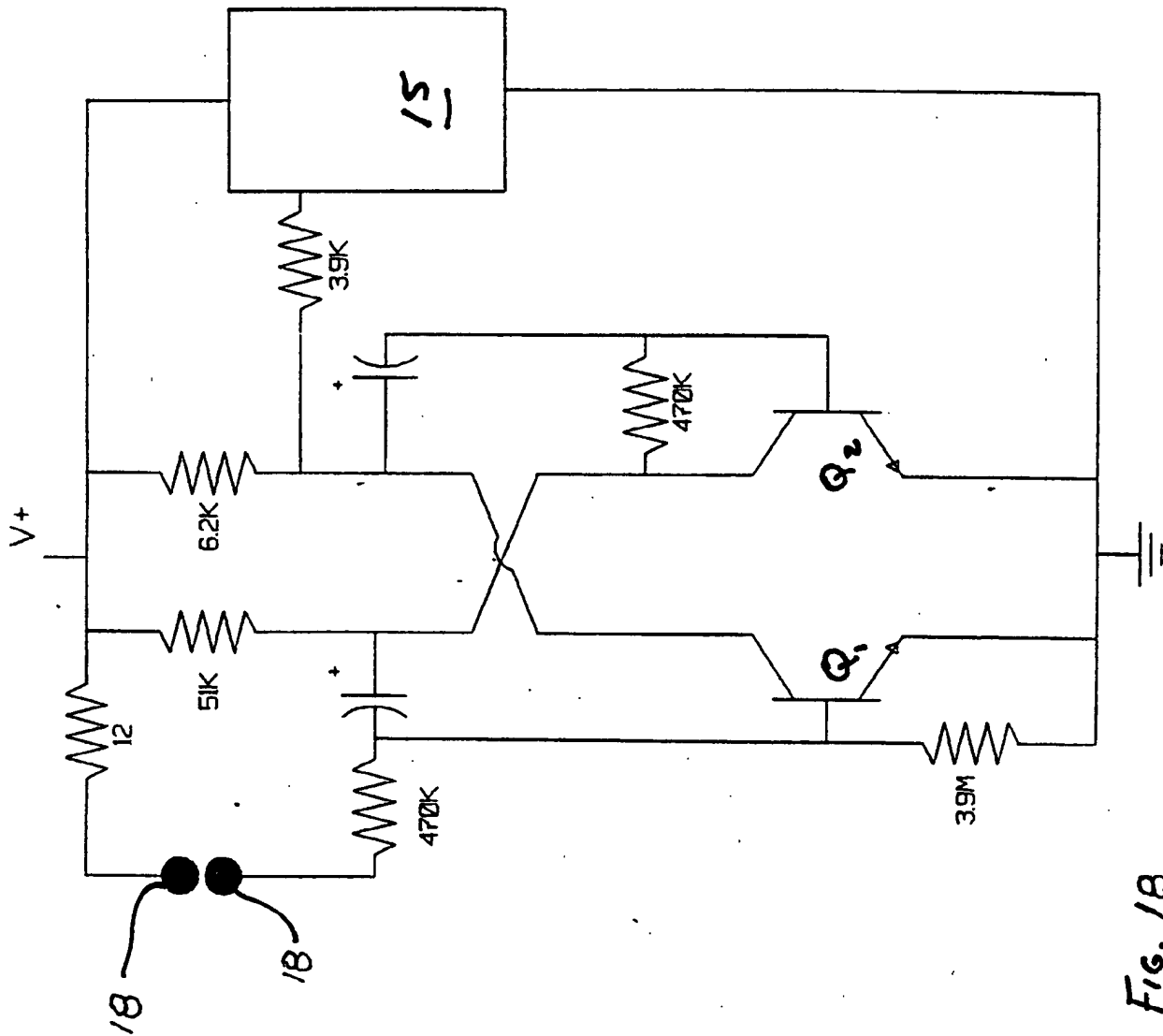


FIG. 18

